



Microbotic Infrastructure Assessment

Problem

There are many inaccessible areas of USACE large lock and dam structures. These areas require special scaffolding or expensive means to reach and may be more easily reached by unmanned sensors. Assessing the integrity of the coating on penstocks 200 ft up the chamber or determining the condition of tainter gates is critical to maintaining operational locks and dams. These and other components are often difficult, dangerous and/or expensive to access. Condition assessment of penstocks often requires installation of elaborate scaffolding and lighting. Some tainter gates are only accessible by personnel rappelling from the top of dams. Obviously risk to personnel is high, and the size of the components and conditions under which technicians are working make these assessments very time consuming. Because of the risk and time involved, some penstocks and tainter gates are not inspected as often as they should be.



Approach

Microbotic Infrastructure Assessment research and development focuses on developing a capability to remotely and autonomously assess lock and dam components that are difficult and costly to access, like penstocks and tainter gates. This research is developing remote, autonomous capabilities for the inspection of penstocks and tainter gates specifically, but will be applicable to other difficult-to-access infrastructure components.

Products

A combination of small, tracked and aerial vehicles will be developed which will be able to navigate and collect data, without user interaction, in confined spaces such as penstocks, and along complex vertical structures like tainter gates. Imagery and lidar measurements collected by sensors on the very small vehicles will be processed using custom algorithms designed under this project to automatically detect common defects. The imagery will also be available for manual inspection.

Benefits

Microbotic Infrastructure Assessment will provide a new, cost-effective capability for inspection of penstocks and tainter gates. The microbot inspection will reduce risk to personnel and length of outage required to perform manual inspection.



POC: Jennifer M. Wozencraft
Charles E. "Eddie" Wiggins

Jennifer.M.Wozencraft@usace.army.mil
Charles.E.Wiggins@usace.army.mil